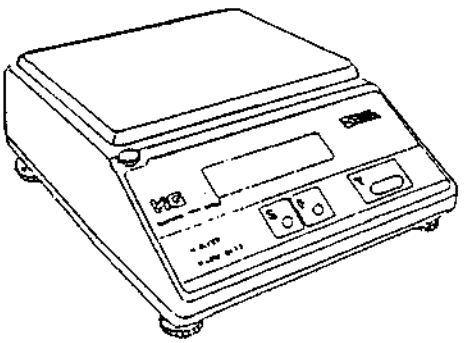
CE300993

Tuning-Fork Scale

HG Series (CE TYPE)

Operation Manual

HG-1000 C



Shinko Denshi

Tokyo

CONTENTS

PAGE

INTRODUCTION..... 1
Four Basic Scale Modes 1
Four Basic Functions 1
Thirteen Weight Unit Variation..... 2
Other Specifications..... 2
Models..... 2
EXTERNAL VIEW & NAMES OF PARTS..... 3
Key Function..... 3
Characters..... 3
INSTALLATION..... 4
Unpacking, Unlocking, Pan Loading..... 4
Leveling, Starting..... 5
Cautions on Use..... 5
SCALE MODE SETTING..... 6
How to Select a SCale Mode..... 6
1. Precision Weighing Scale Mode..... 7
Taring, Bar Graph Display..... 7
2. Counting Scale Mode..... 8
3. Percent SCale Mode..... 10
100% Setting with Reference Sample 10
100% Setting by Key Operation.....11
4. Conversion SCale Mode.....12
VARIOUS FUNCTIONS.....13
How to Select Functions.....13
Setting of Judgement Range.....14
B. Accumulation Function.....15
C. Comparator Function.....16
Setting with Reference Sample 16
Setting by Key Operation.....17
Ranking Indication of Judgment Result.....18
SELECTION OF TWO WEIGHT UNITS.....18
VARIATIONS OF MEASUREMENT MODE in combination of functions...19
HOW TO VERIFY /CHNAGE MODE.....19
CONTENTS OF VARIOUS FUNCTIONS.....20
Part I Contents of Basic Function Modes.....20
Part I - 2 Various Weight Units & Readability Selection.....21
Part II Contents of Comparator Functions 22

Part III Conditions & Results, Integration Time
& Stabilization Speed.....23
Part IV Contents of INterface.....23

LIST OF VARIOUS MESSAGES.....24
Displays, Beeps..... 24
TROUBLESHOOTINGS..... 25
CALIBRATION.....26

BATTERY OPTION.....27
OUTPUT FORMAT.....28

Congratulations to be one of the owners of the multi-purpose tuning-fork scale VIBRA - HG series !

With 6 different weight unit displays, the VIBRA - HG scale offers 16 varieties of function complex, which will satisfy you in any weighing field.

To get the optimum result, select the most suitable function to your weighing purposes and conditions out of the full menu programmed for owners of VIBRA. Let's start to look into the world of VIBRA !

FOUR (4) BASIC SCALE MODES page

1. High Precision Weighing Mode 7
   1/150,000 (HG-15K) to 1/250,000 (HG-5000) divisions.

2. Counting + Weighing Mode 8
   For the best controls of production and inventory, switchable between COUNT & WEIGH by one touch.

3. Percentage + Weighing Mode 10
   Automatic graduation change(1%, 0.1%, 0.01%, 0.001%) to the loading weight. Provided for compound and mixture.

4. Conversion + Weighing Mode 12
   Convertible to any optional unit by setting coefficient. Switchable between Conversion and Weighing by one touch.

FOUR (4) BASIC FUNCTIONS

A. Precision Weighing Function..... 7
B. Accumulation Function.....15
   Convenient for mixing, compound or filling, sums up every measurement data.
C. Comparator Function.....16
   Over/under judgment at upto 4 point setting, with beep, ranking bar, or two-point bargraphs. Convenient in checking package contents, quantity/weight.
D. Comparator + Accumulation Function.....16

SIX (6)WEIGHT UNIT VARIATION

1. mg 2. g 3. kg 4. ct 5. oz 6. lb

-Two units out of these 6 weight units are selectable.- See page 21.

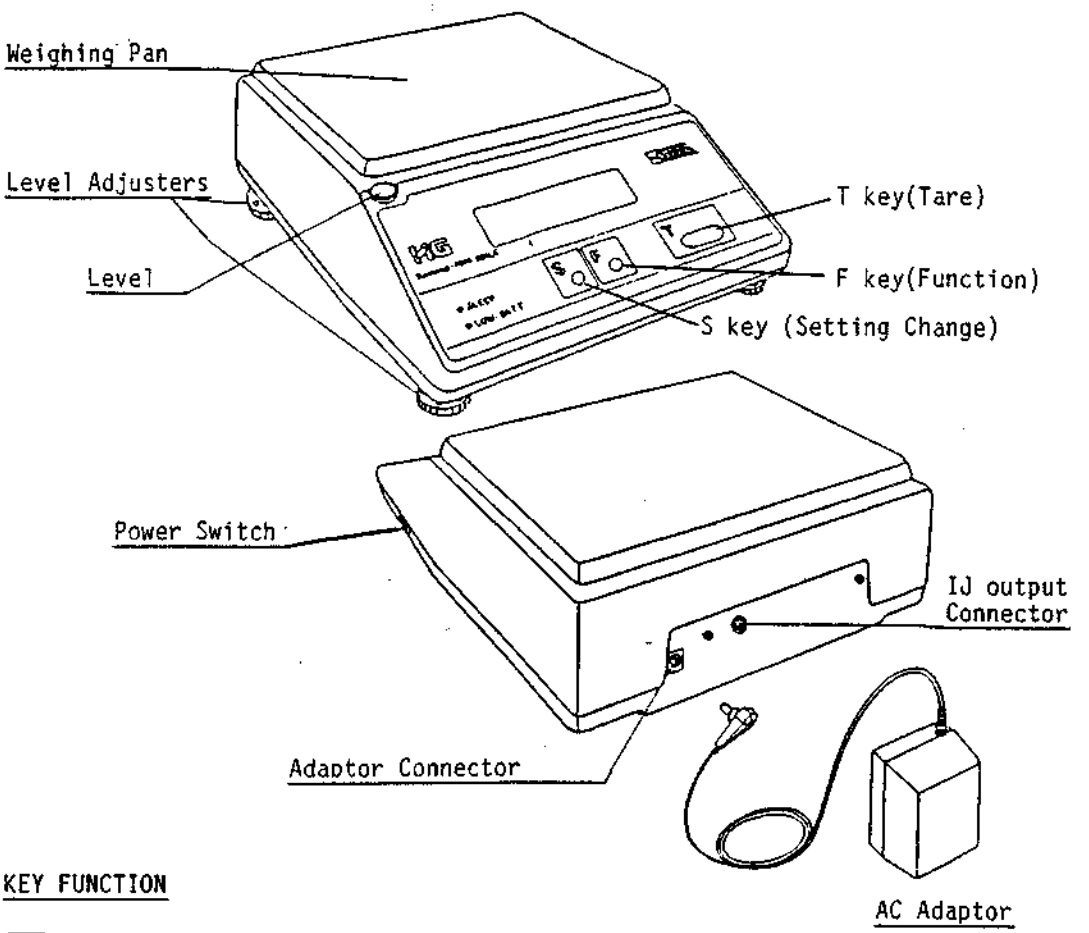
OTHER SPECIFICATIONS

1. Measuring System	:	Tuning-fork frequensy sensing system
2. Taring Range	:	Full weighing range
3. Zero Tracking	:	4% of max. capacity (+2% and -2%) Accuracy of zero tracking is 1/4 e.
4. Span Adjustment	:	Semi-automatic calibration with reference weight
5. Overload Message	:	"O-Err" at max. capacity + 9d.
6. Temperature Coefficient	:	$\pm 3 \times 10^{-6}$/°C (10°C to 30°C)
7. Temperature/ Humidity	:	0°C to 40°C, 80% r.h. or less
8. Power Source	:	DC 9V/400mA with AC adaptor
9. Display	:	Fluorescent of 12.5mm high characters
10. Output	:	IJ output for dedicated devices, standard. A type of RS232C interface pack, option.
11. Functions	:	See page 1.
12. Options	:	1. Rechargeable built-in battery unit 2. Dedicated printers (CSP-16, CSP-193) 3. Bidirectional RS232C output interface
13. Under Weighing	:	Provided as standard

MODELS

MODELS	HG-1000	HG-2000	HG-5000	HG-10K	HG-15K
CAPACITY	1000g	2000g	5000g	10kg	15kg
SENSITIVITY	0.005g	0.01g	0.02g	0.05g	0.1g
EC ACCURACY	0.05g	0.1g	0.2g	0.5g	1 g
READABILITY	0.005/0.01/ 0.02/0.05/ 0.1	0.01/0.02/ 0.05/0.1/ 0.2	0.02/0.05/ 0.1/0.2/ 0.5	0.05/0.1/ 0.2/0.5/ 0.1	0.1/0.2/ 0.5/1 2
REPEATABILITY	±0.005g	±0.01g	±0.02g	±0.05g	±0.1g
LINEARITY TOLERANCE	±0.01g	±0.02g	±0.05g	±0.1g	±0.2g
PAN SIZE	170mm dia		220mm x 180mm		
WEIGHT	Approx. 4.5 kg		Approx. 4.7 kg		

EXTERNAL VIEW & NAMES OF PARTS



KEY FUNCTION

[S] : Setting Change & Finish
[F] : Function/Mode change
[T] : Tare & Parameter Change

CHARACTERS

g : Weight unit in weighing, counting, percentage mode (mg, kg, ct replacable)
pcs : Unit indication in counting mode
% : Percentage indication in percentage mode
# : Unit indication in conversion mode
Σ : Indication in accumulation function
M : Indication that a particular setting has been stored.(Blinking:not complete)
◎ : Indication of settled down (Without this mark, the data is not settled.)
◁ : Automatic memory renewal (Simple SCS)

INSTALLATION

1. UNPACKING

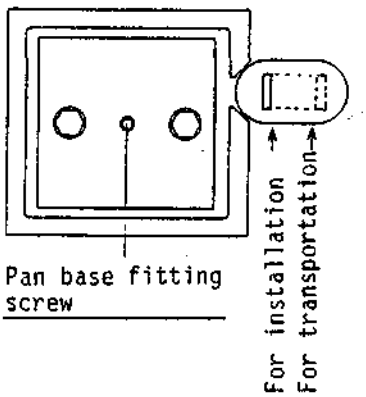
Unpack the container carefully. Examine the packaging and the device for damage, and report to the shipper if any. Try to keep the scale upright. Check for the exclosures as follows:

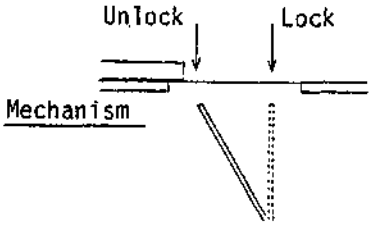
① Scale
② Weighing Pan with Pan Base
③ Operation Manual
④ AC Adaptor

2. UNLOCKING

Locate a black rubber cap at the top of the scale. Remove the cap to find a lock lever in it. Turn the lever to the centre of the scale to unlock.

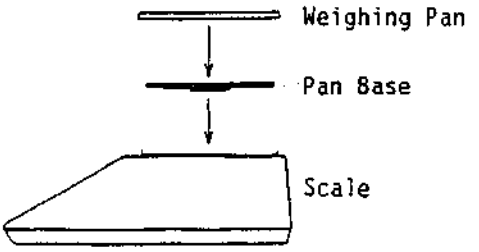
* Before relocation or transportaion, turn the lever to the edge of the scale for locking mechanism.

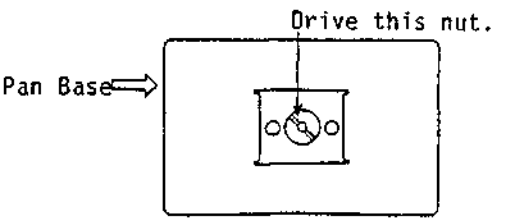




3. WEIGHING PAN LOADING

Place the pan base packed with the weighing pan on the scale. Fix it by driving the nut on the pan base to the screw in the centre of the scale. Place the weighing pan properly on the pan base.

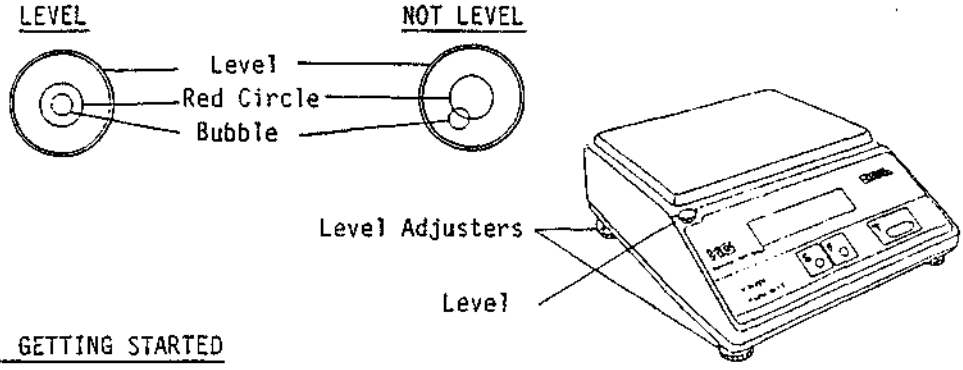




* The receiving element of the pan base is directly linked with the delicate weighing mechanism. A tension or a side force may damage the unit.

4. LEVELING

Watch if the scale is level. Locate the level in left front of the scale, and knurled legs beneath the scale. Drive these legs to centre the bubble in the red circle of the level properly.



5. GETTING STARTED

(1) Connect the AC adaptor with the scale, then plug the cord in line outlet.

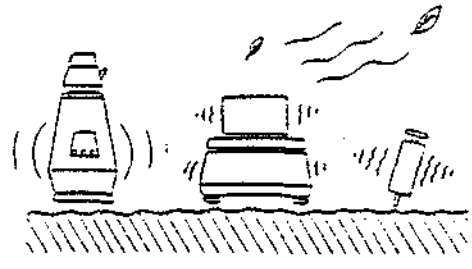
(2) Turn on the power switch on the right side near bottom. The display will light up all segments and characters for about 4 sec. as a self test.

(3) Verify that the display changes by touching the pan slightly, and that it returns immediately to the original by releasing it.

5. CAUTIONS ON USE

VIBRA HG scale is a highly accurate cprecision instrument. Handle/operate it very gently, instal it in good environments for getting optimum results.

* LEVEL Check if all adjusting legs are securely sustaining the scale.
* OVERLOAD If the load exceeds the scale capacity, o-Err will sign it. Do not keep the scale under this condition.
* OPERATION ENVIRONMENTS It is important to place the scale in a quiet area, with little vibration or air draft, away from heat or cooling sources. Do not place in such areas as :
  1. Area exposed to a wind from a fan or a cooler.
  2. Area exposed to direct sunlight.
  3. On an unstable base or near to a source of vibration.
  4. Area where temperature changes abruptly.
  5. Area in high humidity or dusts.



SCALE MODE SETTING

FOUR SCALE MODES

Select suitable scale mode to your purpose out of the following four modes.

1. Precision Weighing Mode : 1/250,000 to 1/150,000 divisions...see page 7.
2. Counting + Weighing Mode: High precision, easy counting.....see page 8.
3. Percentage+Weighing Mode: Percentage of weight/reference.....see page 10.
4. Conversion+Weighing Mode: Conversion by weight/coefficient...see page 12.

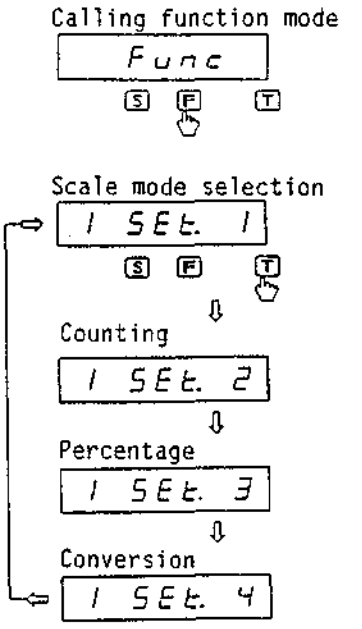
* At the time of delivery, the scale mode is set at 1. Precision Weighing Mode.

HOW TO SELECT A SCALE MODE

① Press the [F] key for about 4 sec. and release it when display shows Func .

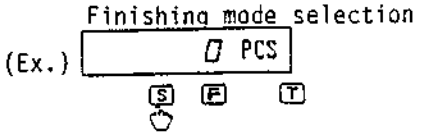
② Then display changes to 1 SEt_, showing the scale selection mode. Select a scale mode by pressing the [T] key which changes the parameter for scale modes.

DISPLAY	SCALE MODE	PAGE
1 SEt 1	Weighing	7
1 SEt 2	Counting+ Weighing	8
1 SEt 3	Percentage + Weighing	10
1 SEt 4	Conversion + Weighing	12



③ Press the [S] key to return to measuring mode with display of the selected mode.

In this stage, pressing the [F] key instead of the [S] key will advance to the SELECTION OF FUNCTION. See page 13.



OPERATIONS

Regarding to measurement in other weight units, see page page 18 in the column. You can select 2 units out of 6 each of Mode A and B.

1. PRECISION WEIGHING SCALE MODE

WEIGHING WITHOUT TARE

Connect the AC adaptor with the scale at the rear, plug the cord in line outlet. Turn the power switch of the scale.

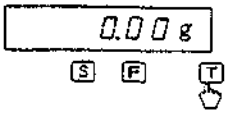
(1) Press the [T] key and verify that the display is cleared to "0".

(2) Load objects on the scale and read the display.

WEIGHING WITH TARE

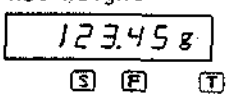
(1) Place the tare container on the scale. Press the [T] key to display "0".

Tare operation

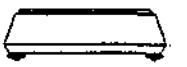


(2) Load objects in the container, and read the display which is the net weight value.

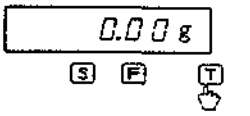
Net weight



(3) When the container is removed, the tare weight will be indicated as a negative value with "-" mark. Press the [T] key to clear to "0".



Zero setting



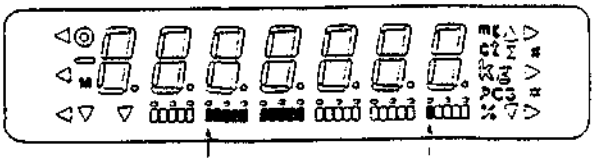
* Before loading or unloading, allow the scale until ◎ mark appears which shows stabilization of the scale.

** Whenever you want to display "0" in the operation, press the [T] key at any optional moment.

*** o-Err message will appear if the load exceeds 90 divisions over the scale capacity. The net weighing range will be reduced by the tare container from the capacity of the scale.

BAR GRAPH DISPLAY

The bar graph indicates the range of the scale and remaining capacity with a load. In the comparator mode, the bar graph performs judgments.

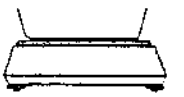


2. COUNTING SCALE MODE

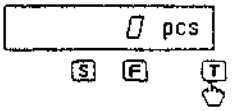
The HG scale employs unique automatic memory renewal system, namely Simple Self Counting System.
By this SCS, highly accurate reference unit weight will be obtained automatically, simply by adding optional number of samples (within three times of that the display requires).

COUNTING OPERATION BY SIMPLE SCS

(1) Place a container, if any, on the scale and press the [T] key. Verify that the display is "0".

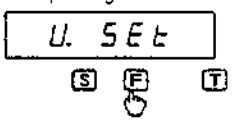


Tare/Zero setting



(2) Press the [F] key and release it when U SEt appears.

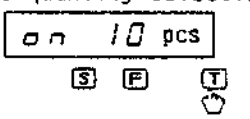
Sampling start



(3) Then on [ ]pcs appears. Press the [T] key to select quantity of samples to be loaded. By every pressing of the [T] key, the quantity will change as follows:

⇨5⇨ 10⇨30⇨ 100⇨

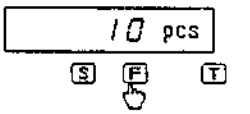
Sample quantity selection



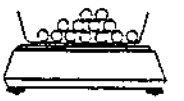
(4) Load samples of the quantity selected in the display. Press the [F] key to memorize unit weight of loaded samples temporarily.

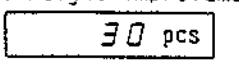
After a black out for a moment, a quantity display and ◁ mark starts blinking with a beep which signs the memorization is over. The blinking shows that the mode is in unit weight improvement (sampling).

Unit weight memolizing



Automatic unit weight improvement

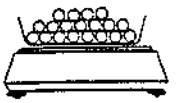




(5) Load optional quantity of samples within tree times of the quantity in the display. Then the unit weight will be improved to that of the total quantity of the samples loaded. Beep will comes again.

(6) Add some more samples, but within three times of the quantity displayed, to improve accuracy of the unit weight. Without any key operation, thus, the unit weight will be improved by increasing samples by and by repeatedly.

Automatic unit weight improvement



85 pcs

(7) At any sample quantity you want to finish, pressing the [F] key will finish the improvement operation. A beep comes out and the display will turn to ordinary counting mode.

Improvement (sampling) finish

85 pcs

[S] [F] [T]

NOTES

1. If sample quantity added is over three times of the displayed amount, Sub PCS will appear. Unload samples until the Sub PCS disappears.

2. In case the accuracy of memorized unit weight is unsatisfactory, Add PCS will appear. Add samples until the Add PCS disappears.

3. Under Sub or Add status, pressing the [F] key will memorise unit weight for loaded samples. With such erroneous unit weight, counting results may be incorrect.

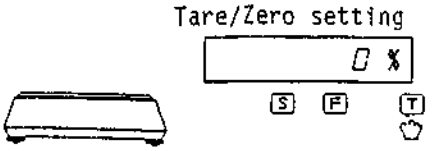
4. L-Err appears with such sample which unit weight is less than 1/200,000 of the scale capacity. In this case, counting operation is impossible with this scale, because the unit weight of the object is lighter than specified.

3. PERCENT SCALE MODE

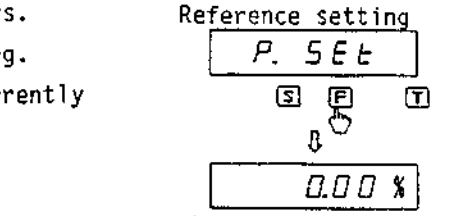
100% SETTING WITH REFERENCE SAMPLE

Percentage measurements by a reference sample as 100% memorizing in the scale.

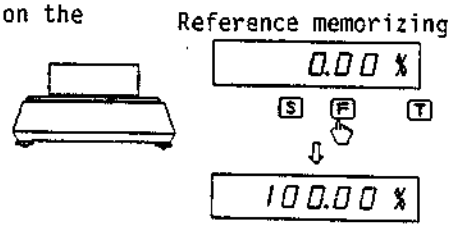
(1) Press the [T] key to indicate "0".
Also press the [T] key when use a tare container.



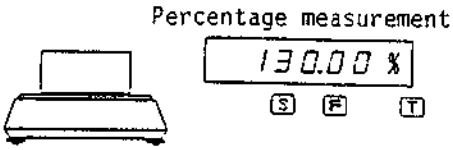
(2) Press the [F] key until P SEt appears.
M sign and some value will start blinking.
The value shows 100% reference value currently set.



(3) Place a reference sample for 100% value on the scale and press the [F] key.
After a black out for a moment, a beep will come out to sign the memorization of the value for 100%. Then the mode turns to percentage measurement mode.
Unload the sample from the scale.



(4) Loading an object on the scale will read the percentage to the reference value memorized just before.



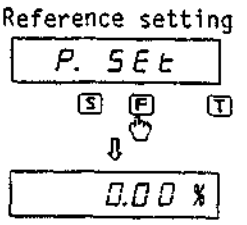
* Division of measured percentage will vary according to the weight value of the reference sample as 100% per capacity of the scale.

100% weight/scale capacity	display division
under 0.05%	L-Err
0.05% ~ under 0.5%	1 %
0.5 % ~ under 5 %	0.1 %
5 % ~ under 50 %	0.01 %
50 % and over	0.001 %

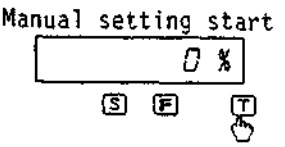
100% SETTING BY KEY OPERATION

Percentage measurements per 100% reference value set by key operation.

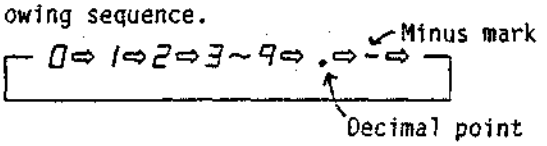
(1) Press the [F] key until P SEt appears.
M sign and some value will start blinking.
The value shows 100% reference value currently set.

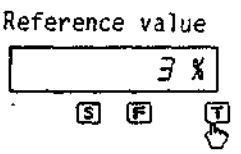


(2) Pressing the [T] key will display "0" and bar graphs under it blinking, to start manual setting of the reference value for 100%.

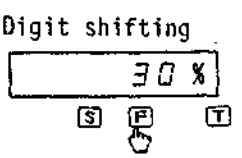


(3) Pressing the [T] key further will change the number of the last digit of the display in the following sequence.

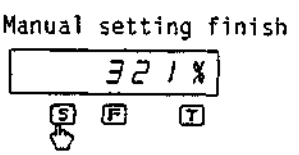




(4) Pressing the [F] key will shift the number at the last digit of the display to the left. Thus, select optional number by the [T] key, then shift it to the left by the [F] key, and set a reference value for 100% finally.



(5) After displaying the reference value, press the [S] key to memorize the value.
A beep comes out and the mode turns to percentage measurement mode.



* The percentage display division will automatically vary as in the case of SETTING WITH A REFERENCE SAMPLE, in page 10.

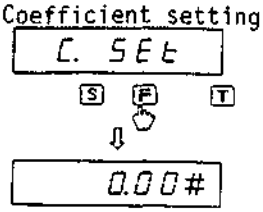
4. CONVERSION SCALE MODE

In this scale mode, the scale displays a weight value of the load, multiplied by a coefficient memorized in the scale.
With this function, the HG scale offers measurements in countless weighing units.

OPERATION

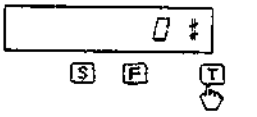
(1) Press the [F] key until C SEt appears. M sign and some value will start blinking for setting new coefficient. The value blinking. is the current coefficient in the memory.

Coefficient setting

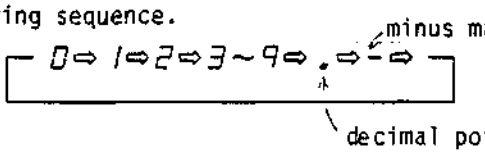


(2) Press the [T] key. Display will show "0" and bar graph underneath will start blinking. Now, it is ready to set the coefficient in the display.

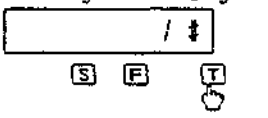
Coefficient setting



(3) Pressing the [T] key further will change the number of the last digit of the display in the following sequence.

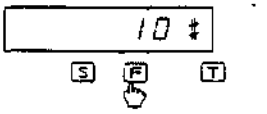


Setting first digit



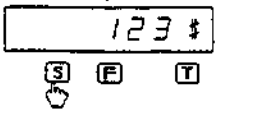
(4) Pressing the [F] key will shift the number at the last digit of the display to the left. Thus, select optional number by the [T] key, then shift it to the left by the [F] key, and set a coefficient value finally.

Setting second digit



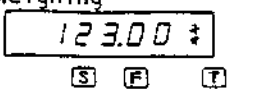
(5) After displaying the coefficient value, press the [S] key to memorize the value. A beep comes out and the mode turns to conversion mode.

Setting finish



(6) Load an object on the scale. The display shows multiplied value of the load by the set coefficient.
Display value = Coefficient x Actual weight of the object

Weighing



100g

(Ex.)

VARIOUS FUNCTIONS

FOUR BASIC FUNCTIONS

The HG scale has Accumulation and Comparator function in addition to the high precision weighing function. In combination of these functions, it offers four basic function complex as follows:

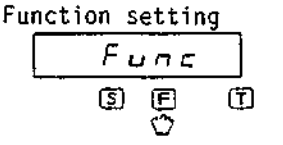
		page
A.	Precision Weighing Function : Simple display of weight data.....	7
B.	Accumulation Function : Display of sum of measured data...	15
C.	Comparator Function : Ranking display of judgments.....	16
D.	Comparator + Accumulation : Display of sum of judgment data...	16

* At the time of delivery, the function is set at above A, simple display.

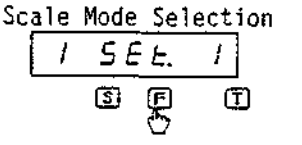
HOW TO SELECT FUNCTIONS

In case the operation follows Selection of Scale Mode, start from (2) of the followings.

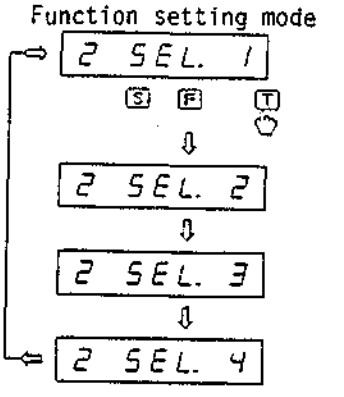
(1) Press the [F] key for about 4 sec. and release it when display shows Func .



(2) Then display changes to 1 SEt . Press the [F] key again to display 2 SEL , which shows the scale is in Function Setting Mode.



(3) Select a function by pressing the [T] key which changes the parameter according to the following table.



DISPLAY	FUNCTIONS	ADVANCE TO PAGE
2 SEL. 1	Simple Weighing	7
2 SEL. 2	Accumulation Display	15
2 SEL. 3	Comparator Function	14
2 SEL. 4	Accumulation + Comparator	14

(4) In case you selected Simple Weighing 2 SEL. 1 or Accumulation Display 2 SEL. 2 , press the [S] key to finalize the setting.

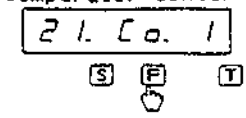
In case you selected Comparator 2 SEL. 3 , or Comparator + Accumulation 2 SEL. 4 , advance to the next page for setting judgment range.

SETTING OF JUDGMENT RANGE - In case Comparator Function is selected -

(5) After completion of selection of Comparator Function or Comparator + Accumulation Function by (3) in page 13, press the [F] key to display 2 1 Co _, which is for setting contents of the comparator function.

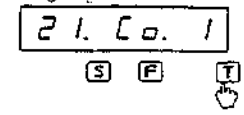
* For the details of the contents, see page 22.

Comparator contents



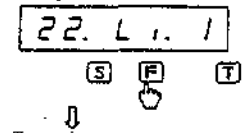
(6) Fisrt, set the judgment condition by pressing the [T] key, which changes the parameter by every pressing of it.

Judgment condition



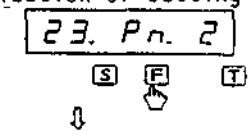
(7) Press the [F] key to advance to next Setting of the Judgment Range. Set it by pressing the [T] key.

Judgment range



⇩

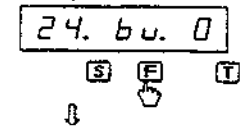
Selection of setting points



As aboves, pressing the [F] key will advance the setting contents. Set at your optional parameters by pressing the [T] key at any stage and advance by the [F] key.

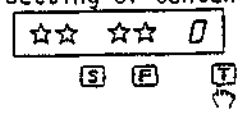
⇩

Beep control

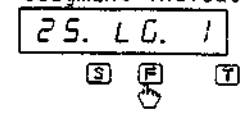


⇩

Setting of Contents

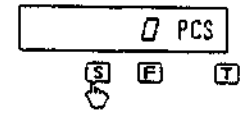


Judgment indication



(8) After completion of the setting of contents, press the [S] key to return to the measurement mode.

Finish



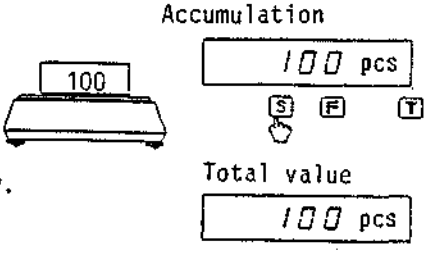
* If you want to set or verify parameters for additional functions after 2 SEL. mode, press the [F] key. See page 20 for additional functions. At any stage, pressing the [S] key will return to the measurement mode.

ACCUMULATION FUNCTION

The Accumulation Function of the HG scale offers summing-up and display of measured data repeatedly, usuful for mixing or filling.

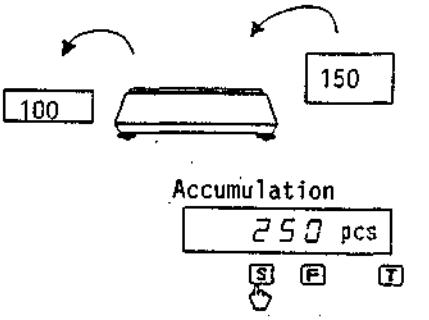
OPERATION

(1) Load an object on the scale. After stabilization mark ◎ appears, press the [S] key to accumulate the display value. The total amount will be seen for a moment with Σ mark in the display.

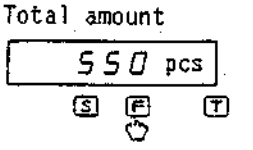


(2) Unload the object and allow the "0" display is settled down with ◎ mark. Then load another object.
After stabilization, press the [S] key to accumulate the value and display the total for a moment as above (1).

* Loading and unloading should be done after ◎ mark displayed for stabilization.



(3) To fix the total amount in the display, press the [F] key. The total amount will be displayed with the Σ mark.
To clear the accumulation to zero, press the [T] key in this total displaying mode.



NOTE

1. Pressing the [S] key for accumulation before settled down, ie, before reading the ◎ sign, the total value may be erroneous.
2. In the simple weighing mode, with weighin unit "B", the accumulation is not effective. See page 7 and page 18.
3. To avoid duplication, following accumulation will not be effective unless unloading the previous load, after once the [S] key is pressed.
4. Or, instead of unloading, pressing the [T] key after accumulation by [S] key will continue the accumulation with displaying "0". By this, you can add next object on that still remaining on the scale. This is convenient for mixing.
5. In the Counting mode, renewal of unit weight will automatically clear the total.

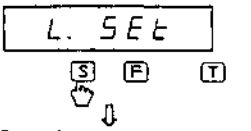
COMPARATOR FUNCTION

SETTING WITH REFERENCE SAMPLE FOR JUDGMENT

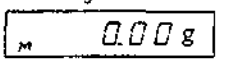
Setting reference points (1 point to 4 points) with samples, read ranking or bar graph for result of judgment. Beep is available. Convenient for measurement within a preset value.

(1) Press the [S] key until L SEt appears. M sign and some value will start blinking. The value shows that currently set.

Comparator function setting



Setting start

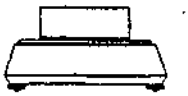


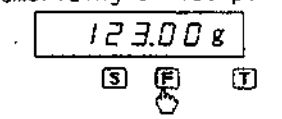
* Reference values should be:

1st point < 2nd point < 3rd point < 4th point

(2) Load the sample for the 1st reference point on the scale, and press the [F] key. After a black out for a moment, a beep will sound to sign the memorization of the set value with displaying it. Then advance to the 2nd point setting.

Memorizing of 1st point



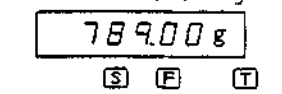


(3) Load the sample for the 2nd reference point and press the [F] key. A beep will sound to memorize the value and advance to the setting of next point.

Memorizing of 2nd point

(4) As above, when settings are completed, the M sign will disappear, and the mode turns to measurement mode.

Finish of setting



NOTES

1. In case that only 1 point is selected to set, M sign will disappear and setting will finish at above operation (2).
2. Such settins as 1st point≷2nd point≷3rd point≷ 4th point will be error.
3. In L SEt mode, pressing the [S] key enables to verify the set value.
4. Bars underneath will show every set points and judgment results. See page 18 for ranking display.
5. As to beep performance, see page 22 for beeps.

MANUAL SETTING OF POINTS FOR JUDGMENT

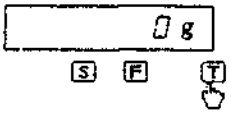
Setting reference points (1 point to 4 points) by key operation, read ranking or bar graph for result of judgment. Beep is available. Convenient for measurement within a preset value.

(1) Press the [S] key until L SEt appears. M sign and some value will start blinking. The value shows currently set value.

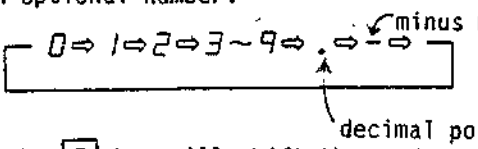
Comparator function mode

(2) While the display is blinking, press the [T] key to display "0" and bar graph underneath. Now the manual setting is starting.

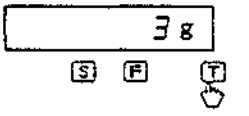
Setting start



(3) Pressing the [T] key further will change the last digit of the display successively as follows. Select an optional number.

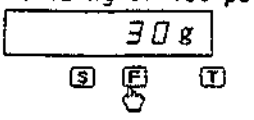


Input of value



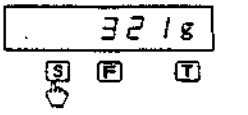
(4) Pressing the [F] key will shift the number at the last digit to the left. Set the second digit by pressing the [T] key. As such, shift by [F] key, and set a number by the [T] key to complete setting a value.

Memorizing of 1st point



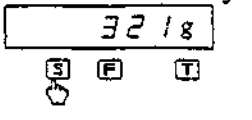
(5) After completion of setting value for the 1st point, press the [S] key. After a black out for a moment, a beep will come out with the set value to sign that the value is memorized. Advance to set the next point by repeating above (2) to (5).

Memorizing of 2nd point



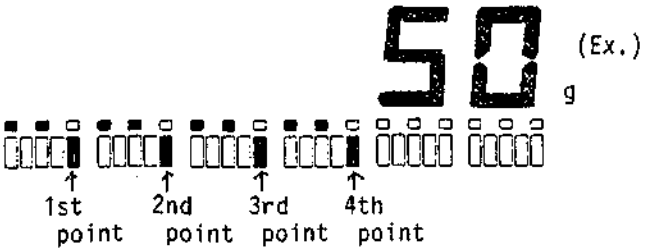
(6) When setting for all points are completed, the M sign will disappear, and the mode turns to measurement mode.

Finish of setting



RANKING INDICATION OF JUDGMENT RESULT

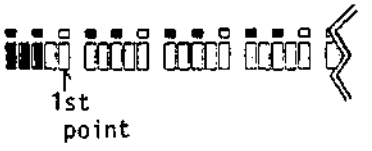
1. Display of reference value at each set point



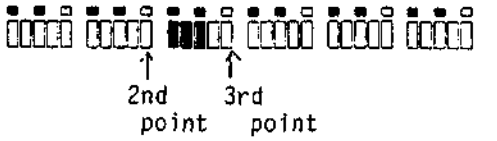
In the L SEt mode, pressing the [S] key will read currently set reference value at each point, which is shown by a bar at corresponding position as in the above illustration.

2. Display of judgment result

When result is under the 1st point:



When result is between 2nd & 3rd point:



BEEP SIGN OF JUDGMENT RESULT

See page 22.

SELECTION OF TWO WEIGHT UNITS - continued from page 7, the column -

With the HG tuning-fork scale, you can weigh with two different or same weight units, one in Mode A and the other in Mode B. For the contents, see page 21 . From/to Mode A and Mode B, switchable by hitting [F] key.

1. Unit"kg", "g", "mg" and "ct" are indicated by character in the display. Other weight units are indicated by ▶ marks, upper in the display for A mode, and lower in the display for B mode.
2. To change the weight unit, call n1. uA for mode A and n3. ub for mode B, after calling Func , referring to page 6, (1).
3. Contents for each parameters in n1. uA mode and n3. ub mode, refer to page 21.
4. All additional functions than ordinary weighing are effective only in mode*

* In relation to above 2, sticking small stickers printed weight unit *A. may be convenient.

** Unit "8" is settable only in ORDINARY WEIGHING SCALE MODE.

VARIATIONS OF MEASUREMENT MODE in combination of functions

You can select any scale mode from the following list in combination of HG functions.

O = effective

SCALE MODE	MEASUREMENT MODE unit	function	FUNCTION Accumulation	Comparator	Remarks
ORDINARY WEIGHING	g	Weighing	O	O	A
	Σ g	Accumulation	O	-	B
COUNTING MODE	pcs	Counting	O	O	A
	Σ pcs	Accumulation of pcs.	O	-	B
	g pcs	Unit weight	-	-	
	g	Weighing	-	-	
PERCENTAGE MODE	%	Percentage	O	O	A
	Σ %	Accumulation of %	O	-	B
	g	Weighing	-	-	
CONVERSION MODE	#	Conversion	O	O	A
	Σ #	Accumulation of Conv.	O	-	B
	g	Weighing	-	-	

Remarks : A - Ranking display is effective.
B - Ineffective with setting at COMPARATOR mode.

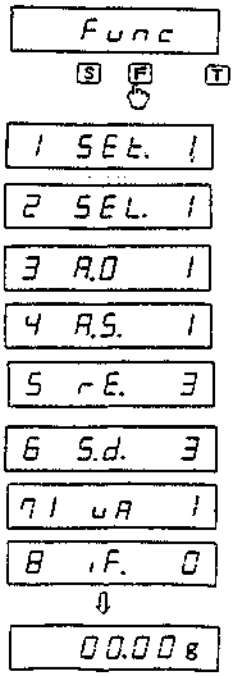
HOW TO VERIFY / CHANGE MODE

(1) Press the [F] key until `Func` appears.

(2) `1 SEt 1` will appear first with set parameter at the end of the display. Pressing the [F] key changes function mode successively through `2 SEL 1` till `8 iF _`.

(3) By pressing the [T] key, change the contents of every mode by setting parameters at the end of the display. For contents of parameters, refer to page 20.

(4) Presssing [S] key will return the mode to the original measurement mode.



CONTENTS OF VARIOUS FUNCTIONS

PART I

☆ mark shows the status set at the shipping time.

FUNCTIONS	DISPLAY		CONTENTS	
FUNDAMENTAL SCALE MODE	1 SEt	☆ 1	Ordinary Weighing Scale (Weight Measurement only)	
		2	Counting Scale (Counting + Weight Measurement)	
		3	Percentage Scale (Percentage + Weight Measurement)	
		4	Conversion Scale (Conversion + Weight Measurement)	
ADDITIONAL FUNCTIONS	2 SEL	☆ 1	Ordinary Display	Advance to 3 A0
		2	Accumulation	
		3	Comparator	Advance to 21 Pn
		4	Comparator + Accumulation	
AUTO ZERO	3 A0	0	Not effective	
		☆ 1	Automatically adjusts to ZERO point	
AUTO SLEEP	4 AS	0	Not effective	Effective with battery option
		☆ 1	Automatically turns display off	
INTEGRATION TIME	5 rE	0	For small amount liquid measurements	
		☆ 1	Short ↕ Long	Quick ↕ Slow
		2		In a good measurement condition ↕ In a disturbed measurement condition
		3		
		4		
		5		
STABILI-ZATION	6 Sd	☆ 1	Rough ↕ Strict	Quick ↕ Slow
		2		
		3		
		4		
WEIGHT UNIT & READABILITY	71 uA 72 dA 73 ub 74 db		See following page 21.	
*** OUTPUT CONTROL	8 oF	☆ 0	Output is not effective	
		1	Constant serial output (Old format, 6-digit) *, **	
		2	Constant serial output (New format, 7-digit)	
		3	CE type special format, satisfying EC norm. "/" will be inserted before the last numeral digit. Ex. + 0 1 2 3 . 4 5 / 5 sp g sp S CR LF	

* If set at 8 oF1 , 81 o.c. for output control follows.
Advance to page 23, lower column, CONTENTS OF INTERFACE.

** For 6-digit format, see page 28, 29.

*** When the function lock (switch inside) is effective, ie, in CE mode, the settings for the output are held as set when the lock was open.

PART I - 2 VARIOUS WEIGHT UNITS & READABILITY SELECTION (Function 71 to 74)

FUNCTIONS		DISPLAY		CONTENTS
GROUP "A"	WEIGHT UNITS	71 uA	1	mg
			2	g
			3	kg
			4	ct
			5	oz
			6	lb
	* LEAST READABILITY	72 dA	1	Fine Ex.HG-2000 0.01g
			2	0.02g
			3	0.05g
			4	0.1 g
			5	Coarse 0.2 g
GROUP "B" (Unit "B" is settable only in ORDINARY WEIGHING MODE.)	WEIGHT UNITS	73 ub	0	No unit displayed
			1	mg
			2	g
			3	kg
			4	ct
			5	oz
			6	lb
	* LEAST READABILITY	74 db	1	Fine Ex. HG-2000 0.01g
			2	0.02g
			3	0.05g
			4	0.1 g
			5	Coarse 0.2 g

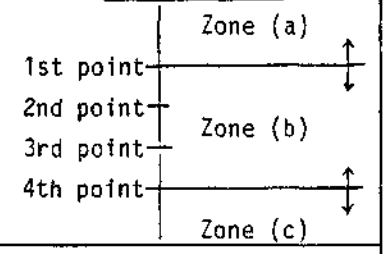
* When the function lock (switch inside) is effective, ie, in CE mode, the settings for the least readability are held as set when the lock was open.

PART II CONTENTS OF COMPARATOR FUNCTIONS (Function 21 to 25)

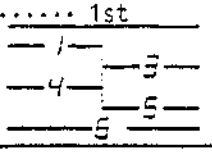
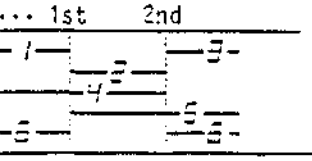
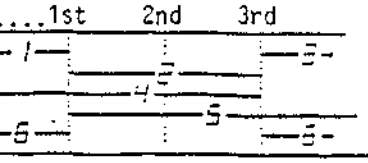
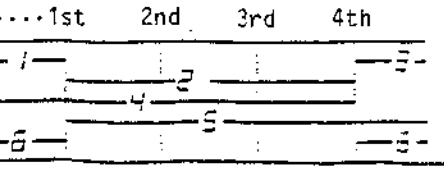
In case the scale is set in the Comparator Mode 2 SEL 3 or 2 SEL 4 , following functions will be displayed before displaying 3 A0 ⌴ .

FUNCTIONS	DISPLAY		CONTENTS
JUDGEMENT CONTROL	21 Co ☆	1	Constant judgement, even data is unsettled.
		2	Judgement after data has settled down.
JUDGEMENT RANGE	22 L, ☆	0	No judgment around zero point.
		1	Judges for all range.
SETTING POINTS	23 Pn ☆	1	1 point setting 25 LO 2 unsettable
		2	2 points setting " settable
		3	3 points setting " unsettable
		4	4 points setting " unsettable
BEEP CONTROL *1	24 bu ☆	0	OFF, no beeps
		1	ON in zone (a)
		2	ON in zone (b)
		3	ON in zone (c)
		4	ON in zone (a) + (b)
		5	ON in zone (b) + (c)
		6	ON in zone (a) + (c)
JUDGEMENT INDICATION	25 LO ☆	1	Ranking display
		2	2-point bar graph, effective in 2-point setting.

Zone Division



*1. Setting points and beep status

1 Point Setting	
2 Points Setting	
3 Points Setting	
4 Points Setting	

PART III MEASUREMENT CONDITIONS & RESULTS, IN RELATION TO INTEGRATION TIME & STABILIZATION SPEED SETTING

	Integration Time	Stabilization Speed	Results
Conditions			
Good	S rE 1	6 Sd 4	Accurate
⌇	⌇	⌇	
Normal	S rE 3	6 Sd 3	⌇
⌇	⌇	⌇	
No good	S rE 4	6 Sd 1	Not very accurate
Measurement			
Precise	S rE 4	6 Sd 1	Slow
⌇	⌇	⌇	
Normal	S rE 3	6 Sd 3	⌇
⌇	⌇	⌇	
Coarse	S rE 1	6 Sd 4	Quick

PART IV CONTENTS OF INTERFACE

FUNCTIONS	DISPLAY		CONTENTS
Output Control	8 1 oc	0	No output
		1	Constant serial output
		2	Constant serial output when stabilized.
		3	Output by pressing [S] key.
		4	Automatic output with a load.
		5	One output when stabilized. *1
		6	" *2
		7	One output by pressing [S] key but after stabilized.
Baud Rate	8 2 bL	1	1200 bps
		2	2400 bps
		3	4800 bps
Parity Bit	8 3 P.A.	0	No parity bit
		1	Odd parity check
		2	Even parity check

*1 : No output with unstable data.

*2 : Constant output with unstable data.

LIST OF VARIOUS MESSAGES

DISPLAYS

Appears by pressing [F] key :

Func	:	To call functions, scale modes, calibration mode.
U. SEt	:	To start sampling (unit weight setting) in COUNTING mode.
P. SEt	:	To start setting of reference value for 100% in PERCENTAGE mode.
C. SEt	:	To start setting of constant in CONVERSION mode.
CAL	:	To start calibration (span adjustment).*

Appears by pressing [S] key :

L SEt	:	To start setting reference points in COMPARATOR mode.

Appears by other operations :

Add	:	Request to add samples. Sample quantity is not sufficient.
Sub	:	Request to reduce loaded samples. Sample quantity is too many.
L-Err	:	Sample unit weight is too light for the scale. Unavailable to to set as a reference unit weight.
o-Err	:	Overload message.
-----	:	Erroneous input, or not set yet, or 1st point value ≧ 2nd point.
1-Err	:	Reference weight in calibration operation is less than 50% of the capacity of the scale.
2-Err	:	In calibration operation, error value exceeds the 1% tolerance, or the scale is defective.

BEEPS

—	:	To indicate completion of data accumulation.
———	:	To indicate completion of storing parameters to be set.
— —	:	Request to add samples, with Add ☆ pcs display.
— — —	:	Error message, such as "Sample is too light",or misoperation of keys.

* When the function lock (switch inside) is effective, ie, in CE mode, the CAL function is locked to unavailable to calibrate the scale.

TROUBLESHOOTINGS

SYMPTOMS	CAUSES & REMEDY
Setting of judgment points impossible	* Function setting is erroneous. See page 13. * Reference value is over the capacity of the scale. * Values are set as : 1st ≧ 2nd ≧ 3rd ≧ 4th
Display does not change with a load	* The mode is not in a measurement mode. May be in such mode as : accumulation, or setting modes.
Display is unstable	* Affected by a wind or oscillation. Check the location and the response speed. * The installation base is unstable. Check the base. * Weighing pan or tare touches something. Check around.
Erroneous value reads in display	* Wrong taring operation. See page page 7. * Scale is not level. See level, page 5. * The weighing pan or the tare touches something. Check. * The span has chnaged by relocation or after long time lapse. Calibrate the scale referring to page 26.
Wrong linearity	* Characteristics have changed, or mechanism adjustment has changed by some reason. Contact the shipper.
No display	* Adaptor is not connected, or the power switch is OFF. * Battery has been consumed (with battery option). Connect the adaptor, charge the battery.
LOW-BATT lamp lights	* Battery voltage drop (with battery option). Connect the adaptor, charge the battery.
SLEEP lamp lights	* 3 minutes have passed after last measurement. Press any key, or change the display by loading some (with battery option).
b-Err appears	* Electronic error, by a static electricity or a noise. Contact the shipper.
Unavailable weighing upto the capacity. o-Err appears	* Gross load weight exceeds the scale capacity. Weighing range = Full weighing range - Tare value * Weighing range has changed by some damage on the weighing mechanism. Contact the shipper.
u-Err appears	* Something contacts the weighing pan to lift it. * The balance of the mechanism has changed by some reason. Contact the shipper.

* Check if the lock is opened.

CALIBRATION (SPAN ADJUSTMENT)

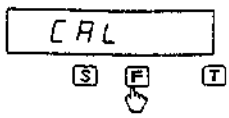
* When the function lock (switch inside) is effective, ie, in CE mode, Calibration is unavailable by the user. Contact the shipper.

To achieve optimum accuracy from the scale, it should be calibrated in the area in which it is used, and recalibrated when it is relocated to other area.

The following calibration procedure is simple, and not subject to operator errors, but does require a reference weight of the full capacity of the scale.

(1) For most precise calibration, warm up the scale for 30 minutes prior to the operation. Press the [F] key unitl CAL appears.

Calibration start

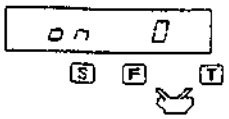


(2) Press the [T] key, with it still held down, just hit the F key, then release both keys together.

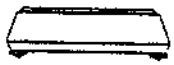
*See page 27 middle.

(3) The display will indicate unit □ * Select weight unit from parameters "1" to "d", by pressing the [T] key. The contents of the parameters are the same as at function 71 uA . See page 21. After setting the parameter, press the F key.

Zero adjustment

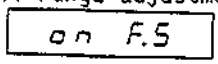


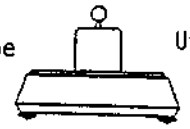
(4) The display will indicate on 0 . Verify that no load is placed on the scale, as the zero adjustment is automatically achieved.



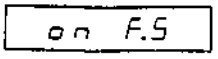
(5) The display will automatically advance to on FS . Apply the reference weight of the full capacity of the scale just in the centre of the weighing pan. The span adjustment will automatically be achieved. Use a weight of the unit selected in above (3).

Full range adjustment



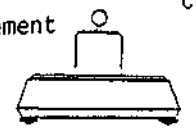


Under auto-calibration



(6) When the calibration is completed, the display will automatically return to the measurement mode.

Calibration finish



NOTES

1. To stop the calibration operation, press the [S] key.
2. 0-Err signs that the reference weight is over the full capacity.
3. The calibration is available with a reference weight of over 50% of the scale capacity. Nevertheless, we recommend to adjust by a full capacity weight. 1-Err will appear if the load is less than 50% of the capacity.
4. 2-Err will appear if the error exceeds 1% of the capacity, or any other object than a reference weight. Or, perhaps the scale is defective. Contact the shipper.

* From page 26 -

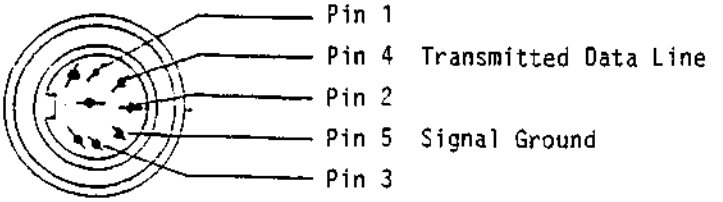
unit □ will not appear in setting at 1 SEt 1 and 73 ub 0 at the same time. The display will advance to on 0 . In this case, use a reference weight of the weight unit selected in function 71 uA□ .

BATTERY OPTION (NiCd battery pack)

Charge hours	:	Approx. 8 hours under power switch of the scale "OFF".
Operation hours	:	Approx. 5 hours continuous operation without output.
Auto-Sleep	:	Sleeps 3 minutes after last operation, for power saving.
Low Battery	:	LOW-BATT lights on when the voltage falls under the specification.

OUTPUT FORMAT

VIBRA HG scale provide a serial data transmission output.
These signals are transmitted by DIN type 8-pin connector on the rear panel of the scale.



Only Pin 4 and Pin 5 are used for the scale's data transmission as shown by above illustration.
Other pins are unavailable, because they are occupied by the scale circuit.

CONTENTS OF THE TRANSMITTED DATA

8-bit words (ASCII standard character codes), 1 start bit, 2 stop bits and 0 or 1 parity bit.

Each time data is transmitted, the SHINKO scale sends a string of 14 or 15 characters as follows: + or - sign, 6 or 7-digit display reading & decimal point(= 7 or 8 characters together), two unit symbols, two status symbols, one carriage return, and one line feed.

P, D, D, D, D, D, D, D, U, U, S, S, CR, LF

P : Polarity	1 character (+ or -)	
D : Data	7 characters, or 8 characters	
U : Unit Symbol	2 characters (sp G or KG for example)	
S : Status Symbol	2 characters	(sp) S... Data is stabilized
		(sp) U....Data is not stabilized
		(sp) E....Error data

CR : Carriage Return
LF : Line Feed

A TYPICAL STRING

eg. 123.4 g = +, 0, 0, 1, 2, 3, ., 4, sp, G, sp, S, CR, LF
eg. -65.4321 kg
= -, 6, 5, ., 4, 3, 2, 1, K, G, sp, U, CR, LF

In these examples, sp represents a blank (ASCII #40, octal), CR represents a carriage return (ASCII #15), and LF represents a line feed (ASCII #12).

ASCII CODES (EXTRACTION)

Complete listings of the ASCII codes are available, but the following list will be limited to those codes used in SHINKO scales.

Octal Code	Decimal	Hexadecimal	Character	Octal Code	Decimal	Hexadecimal	Character
12	10	0A	LF Line Feed	62	50	32	2
15	13	0D	CR Carriage Ret.	63	51	33	3
40	32	20	sp Space Bar	64	52	34	4
53	43	2B	+	65	53	35	5
55	45	2D	-	66	54	36	6
56	46	2E	.	67	55	37	7
60	48	30	0	70	56	38	8
61	49	31	1	71	57	39	9

OTHER SPECIFICATIONS

Transmission Method : Serial Data Transmission
Baud Rate : 1200 bps, 2400 bps, 4800 bps selectable, see page 23.
Signal Level : TTL level